CLAIMS

1. A method suitable for use in a communication device for determining the disposition of incoming e-mail from a sender, said method comprising the steps of:

establishing the identity of the sender to provide a sender identifier;

determining a cumulative penalty count value associated with said sender identifier;

retrieving a system resource usage status associated with the communication device; and

processing the incoming e-mail on the basis of said cumulative penalty count value and said system resource usage status.

2. The method of claim 1 wherein said step of establishing the identity of the sender comprises the step of ascertaining an IP address for the sender.

3. The method of claim 1 wherein said step of establishing the identity of the sender comprises the step of associating the sender with a peer IP address of the sender TCP connection.

4. The method of claim 1 wherein said step of determining a cumulative penalty count value comprises the step of assessing a penalty count value to said sender identifier for an undesirable activity associated with the sender.

5. The method of claim 4 wherein said cumulative penalty count value comprises an activity penalty count charged to the sender for current undesirable sender activity and a time-dependent penalty count determined from previous undesirable sender activity.

6. The method of claim 5 wherein said time-dependent penalty count comprises a zero value subsequent to a pre-established retention period.

7. The method of claim 5 wherein said time-dependent penalty count comprises a prior activity penalty count value reduced by a decay factor.

8. The method of claim 4 wherein said undesirable activity comprises a member of the group consisting of: sending a large number of e-mails, sending e-mails of relatively large sizes, using a relatively large amount of TCP connection time, and causing a TCP timeout.

9. The method of claim 1 wherein said system resource usage status is a function of a member of the group consisting of: the number of concurrent TCP connections being maintained, the number of e-mail files in an incoming message queue, and the amount of disk space being utilized for an incoming message queue.

10. The method of claim 1 wherein said step of processing the incoming e-mail comprises the step of assigning an operating state to the communication device, said operating state being a function of said system resource usage status.

11. The method of claim 10 wherein said operating state is a member of the group consisting of: a normal operating state, a selective-rejection operating state, and a random-rejection operating state.

12. The method of claim 11 wherein, for said selective-rejection state, if said cumulative penalty count value has a zero value, said step of processing the incoming e-mail comprises the step of accepting the incoming e-mail.

13. The method of claim 11 wherein, for said selective-rejection state, if said cumulative penalty count value has a nonzero value, said step of processing the incoming e-mail comprises the steps of:

specifying a rejection factor;

generating a random number; and

randomly rejecting the incoming e-mail on the basis of said rejection factor and said random number.

14. The method of claim 13 wherein said step of randomly rejecting comprises the step of accepting the incoming e-mail if said random number is greater than said rejection factor and rejecting the incoming e-mail if said random number is not greater than said rejection factor.

15. The method of claim 13 wherein said rejection factor is increased if said system resource usage status increases and said rejection factor is decreased if said system resource usage status decreases.

16. The method of claim 11 wherein, for said random-rejection state, if said cumulative penalty count value has a nonzero value, said step of processing the incoming e-mail comprises the step of rejecting the incoming e-mail.

17. The method of claim 11 wherein, for said random-rejection state, if said cumulative penalty count value has a zero value, said step of processing the incoming e-mail comprises the steps of:

deriving a resource usage factor;

generating a random number; and

randomly rejecting the incoming e-mail on the basis of said resource usage factor, said random number, and said cumulative penalty count value.

18. The method of claim 17 wherein said step of randomly rejecting comprises the step of accepting the incoming e-mail if said random number is greater than a product of said resource usage factor and said cumulative penalty count value, and rejecting the incoming e-mail if said random number is not greater than said product of said resource usage factor and said cumulative penalty count value.

19. The method of claim 18 wherein said resource usage factor is increased if said system resource usage status increases and said resource usage factor is decreased if said system resource usage status decreases.

20. A communication device for determining the disposition of incoming e-mail from a sender, said device comprising:

a penalty count filter module having

means for identifying the sender;

means for assigning a penalty count to the sender, said penalty count being a function of undesirable activity associated with the sender;

means for determining a resource usage value for said communication device in receiving e-mail;

means for specifying an operating state for said penalty count filter module, said operating state being a function of said resource usage value; and

an accept/reject filter for disposing of the incoming e-mail on the basis of said sender penalty count and said operating state.

21. The device of claim 20 wherein said means for identifying the sender includes means for obtaining at least one of a Domain Name Service verification and a peer IP address of the sender TCP connection.

22. The device of claim 20 wherein said undesirable activity comprises a member of the group consisting of: sending a large number of e-mails, sending e-mails of relatively large sizes, using a relatively large amount of TCP connection time, and causing a TCP timeout.

23. The device of claim 20 wherein said system resource usage status is a function of a member of the group consisting of: the number of concurrent TCP connections being maintained, the number of e-mail files in an incoming message queue, and the amount of disk space being utilized for an incoming message queue.

24. A communication device for determining the disposition of incoming e-mail from a sender, said device comprising:

a sender penalty count data structure for storing a current penalty count value associated with the sender;

a system resource usage status file for storing a current usage status value for device e-mail processing resources; and

an accept/reject filter for disposing of the incoming e-mail on the basis of said penalty count value and said usage status.

25. The device of claim 24 wherein said sender penalty count data structure includes an entry comprising a member of the group consisting of: a sender identification value, a cumulative penalty count value, a cumulative e-mail count, a total e-mail size, a total TCP connection time, and a timestamp value.

26. A method suitable for use in a communication device for determining the disposition of incoming e-mail from a sender, said method comprising the steps of:

identifying the e-mail sender by determining a sender IP address;

obtaining a previous sender penalty count value calculated for said sender IP address; and

accepting or rejecting the incoming e-mail based on said sender penalty count value.

27. The method of claim 26 further comprising the steps of:

maintaining a behavior trace table entry for the e-mail sender; and

determining said previous sender penalty count from said behavior trace table.

28. The method of claim 27 further comprising the step of updating sender behavior values in said trace table entry in response to receipt of a sender e-mail.

29. The method of claim 28 wherein said sender behavior values include a member of the group consisting of: the number of e-mails, the total size of e-mails, and the total time of TCP connection time.

30. The method of claim 28 wherein said step of updating sender behavior values comprises the steps of:

reducing said behavior trace table value by a decay factor; and

adding a current behavior trace table value to said corresponding reduced behavior trace table value.

31. The method of claim 30 wherein said decay factor is a function of the time interval between the last two updates of said behavior trace table entry and a pre-established retention period.

32. The method of claim 26 wherein said sender penalty count value is determined from undesirable sender activity occurring over a pre-established retention period.

33. The method of claim 32 wherein said undesirable activity comprises a member of the group consisting of: sending a large number of e-mails, sending e-mails of relatively large sizes, using a relatively large amount of TCP connection time, and causing a TCP timeout.

34. The method of claim 26 further comprising the step of updating said sender penalty count value.

35. The method of claim 34 wherein said step of updating said sender penalty count value comprises the steps of:

reducing said previous sender penalty count value by a decay factor to yield a reduced sender penalty count value, said decay factor being a function of said pre-established retention period; and

adding an activity penalty count value to said reduced sender penalty count value to yield an updated sender penalty count value, said activity penalty count value calculated as a function of current sender e-mail activities.

36. The method of claim 35 wherein said decay factor is further a function of the time interval between calculation of said previous sender penalty count value and calculation of said activity penalty count value.